

Iowa

Iowa's electricity generation comes predominantly from coal-fired power plants. Over 90 percent of the coal purchased for electricity generation in Iowa is mined in the Powder River Basin in Wyoming.¹ Very little coal comes from within the State. Although Iowa's coal has a relatively high heat content, averaging around 20 million Btu per short ton, its use is limited because of its high sulfur content, which averages more than 3 percent by weight.² Given the State's large coal purchases, it follows that the five largest plants in Iowa, including George Neal North, the largest, are coal-fired plants. Three of the largest plants are along the banks of the Missouri River in western Iowa. The largest utility in the State is the MidAmerican Energy Corporation, which operates four of the five largest plants including George Neal North.

The five largest utilities in the State, the MidAmerican Energy Company, IES Utilities Inc., Interstate Power Company, the City of Muscatine, and Central Iowa Power Cooperative, operated 85 percent of Iowa's net summer capability in 1996. These utilities along with one other investor-owned utility, 137 public utilities, and 47 cooperatives, serve a population of almost 3 million at an average price of 5.94 cents per kilowatthour of electricity, the eighteenth lowest in the Nation. Over the 11-year period examined in this report, the fuel mix and capability and generation shares in Iowa remained quite stable.

In 1996, Iowa utilities generated 33.4 billion kilowatt-hours of electricity. The industrial sector accounted for

over 40 percent of retail sales in 1996, while the residential sector accounted for 33 percent, and the commercial sector accounted for 21 percent. From 1986 to 1996, utility electricity retail sales have increased at an average annual rate of 2.9 percent, reaching 35 billion kilowatthours in 1996.

In spite of its largely coal-based generation, Iowa also produces a significant amount of electricity from its only nuclear plant, Duane Arnold, which is operated by the Iowa Electric Light and Power Company. In 1996, the plant produced 11.8 percent of utility electricity generated in the State. Over the 11-year period, Duane Arnold's capacity factor was equal to or higher than the national average.

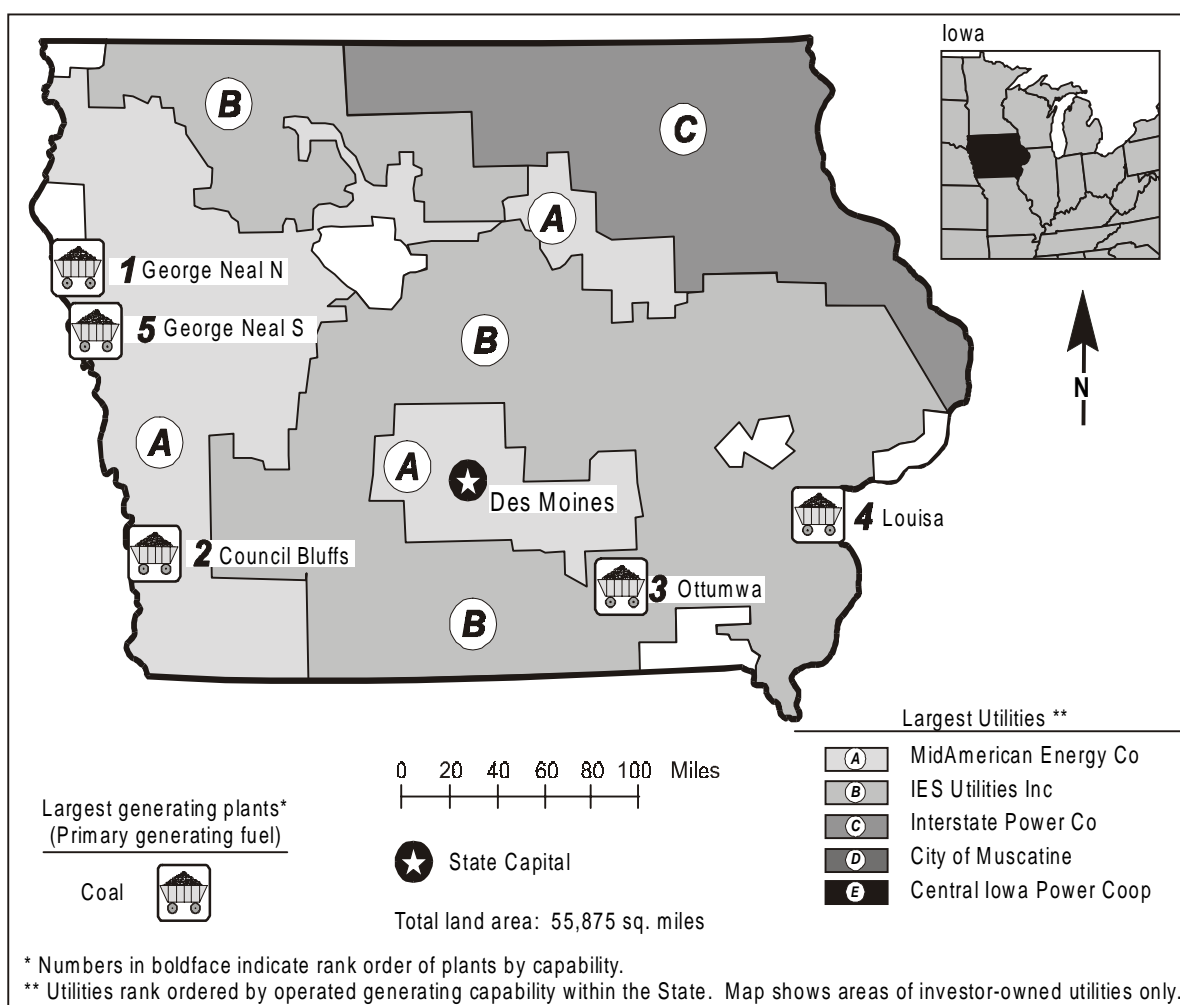
The Clean Air Act Amendments of 1990 cited 977 megawatts of nameplate capacity at six Iowa plants to begin compliance with stricter emissions standards for sulfur dioxide (SO₂) and nitrogen oxides (NO_x) in 1995. In 1996, Iowa's electricity generator emissions ranked twenty-first, nineteenth and twenty-sixth for SO₂, NO_x, and carbon dioxide (CO₂), respectively. Concentrations per square mile ranked twenty-seventh for SO₂, twenty-eighth for NO_x and thirtieth for CO₂.

Iowa has taken some action toward deregulating its electric power industry. In April 1998, a bill was drafted to introduce retail competition, but its introduction is not planned until the 1999 session. In September 1997, the Iowa Utilities Board adopted an action plan to develop a competitive model.³

¹ Energy Information Administration, *Cost and Quality of Fuels for Electric Utility Plants 1997 Tables*, DOE/EIA-0191(97) (Washington, DC, May 1998), p. 31.

² Energy Information Administration, *State Coal Profiles*, DOE/EIA-0576 (Washington, DC, January 1994), p. 35.

³ Energy Information Administration, Status of State Electric Utility Deregulation Activity, http://www.eia.doe.gov/cneaf/electricity/chg_str/tab5rev.html.

**Table 1. 1996 Summary Statistics**

Item	Value	U.S. Rank	Item	Value	U.S. Rank
NERC Region(s)		MAPP	Utility		
Net Exporter or Importer		Exporter	Capability (MWe)	8,161	31
State Primary Generating Fuel		Coal	Generation (MWh)	33,386,873	31
Population (as of 7/96)	2,848,033	30	Average Age of Coal Plants	23 years	
Average Revenue (cents/kWh)	5.94	^a 18	Average Age of Oil-fired Plants	20 years	
Industry			Average Age of Gas-fired Plants	25 years	
Total Capability (MWe)	8,497	^b 29	Average Age of Nuclear Plants	22 years	
Total Generation (MWh)	34,455,527	^b 30	Average Age of		
Capability/person			Hydroelectric Plants	79 years	
(KWe/person)	2.98	^b 24	Average Age of Other Plants . . .	3 years	
Generation/person			Nonutility^c		
(MWh/person)	12.10	^b 27	Capability (MWe)	336	33
Sulfur Dioxide Emissions			Percentage Share of Capability	4.0	32
(Thousand Short Tons)	165	21	Generation (MWh)	1,068,654	36
Nitrogen Oxide Emissions			Percentage Share of		
(Thousand Short Tons)	151	19	Generation	3.1	35
Carbon Dioxide Emissions					
(Thousand Short Tons)	35,938	26			
Sulfur Dioxide/sq. mile (Tons)	2.96	27			
Nitrogen Oxides/sq. mile (Tons)	2.70	28			
Carbon Dioxide/sq. mile (Tons)	643.18	30			

Table 2. Five Largest Utility Plants, 1996

Plant Name	Type	Operating Utility	Net Capability (MWe)
1. George Neal North	Coal	MidAmerican Energy Co	806
2. Council Bluffs	Coal	MidAmerican Energy Co	768
3. Ottumwa	Coal	IES Utilities Inc	714
4. Louisa	Coal	MidAmerican Energy Co	644
5. George Neal South	Coal	MidAmerican Energy Co	624

Table 3. Top Five Utilities with Largest Generating Capability, and Type, Within the State, 1996
(Megawatts Electric)

Utility	Net Summer Capability	Net Coal Capability	Net Oil Capability	Net Gas Capability	Net Nuclear Capability	Net Hydro/Other Capability
A. MidAmerican Energy Co	3,950	3,165	189	591	--	5
B. IES Utilities Inc	2,168	1,382	162	102	520	2
C. Interstate Power Co	710	615	77	18	--	--
D. City of Muscatine	263	263	--	--	--	--
E. Central Iowa Power Coop	151	64	65	22	--	--
Total	7,242	5,489	493	733	520	7
Percentage of Industry Capability	85.2	--	--	--	--	--

-- = Not applicable.

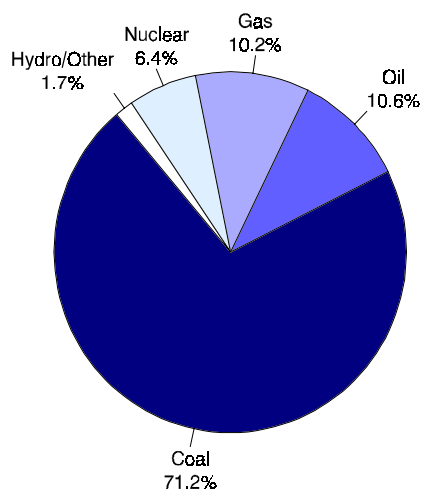
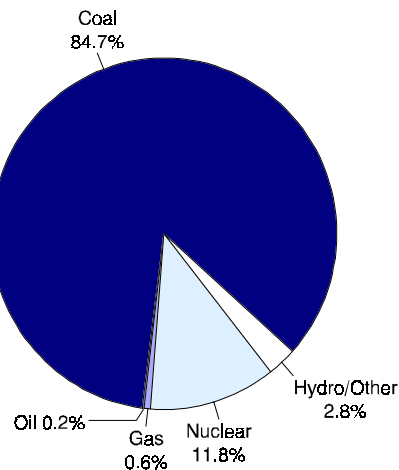
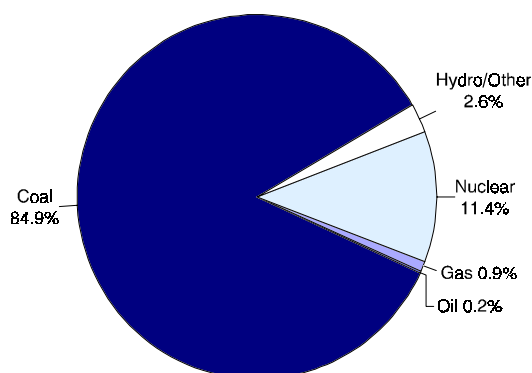
Figure 1. Utility Generating Capability by Primary Energy Source, 1996**Figure 2. Utility Generation by Primary Energy Source, 1996****Figure 3. Energy Consumed at Electric Utilities by Primary Energy Source, 1996**

Table 4. Electric Power Industry Generating Capability by Primary Energy Source, 1986, 1991, and 1996
(Megawatts Electric)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	6,007	5,919	5,807	76.5	73.2	71.2
Oil	582	723	861	7.4	8.9	10.6
Gas	638	809	835	8.1	10.0	10.2
Nuclear	500	515	520	6.4	6.4	6.4
Hydro/Other	124	124	139	1.6	1.5	1.7
Total Utility	7,851	8,090	8,161	100.0	100.0	100.0
Total Nonutility	W	318	336	--	--	--

W = Withheld. -- = Not applicable.

Table 5. Electric Power Industry Generation of Electricity by Primary Energy Source, 1986, 1991, and 1996
(Thousand Kilowatthours)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	19,993,153	25,869,811	28,282,531	82.8	82.8	84.7
Oil	41,574	46,831	51,064	0.2	0.1	0.2
Gas	87,174	262,011	188,725	0.4	0.8	0.6
Nuclear	2,993,335	4,146,811	3,923,631	12.4	13.3	11.8
Hydro/Other	1,021,383	902,547	940,922	4.2	2.9	2.8
Total Utility	24,136,619	31,228,011	33,386,873	100.0	100.0	100.0
Total Nonutility	W	806,034	1,068,654	--	--	--

W = Withheld. -- = Not applicable.

Table 6. Electric Power Industry Consumption by Primary Energy Source, 1986, 1991, and 1996
(Quadrillion Btu)

Fuel	1986	1991	1996	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Coal	0.222	0.282	0.311	83.2	82.9	84.9
Oil	0.001	0.001	0.001	0.2	0.2	0.2
Gas	0.001	0.004	0.003	0.5	1.1	0.9
Nuclear	0.032	0.045	0.042	12.1	13.1	11.4
Hydro/Other	0.011	0.009	0.010	4.0	2.7	2.6
Total Utility	0.267	0.340	0.367	100.0	100.0	100.0
Total Nonutility	W	0.030	0.039	--	--	--

W = Withheld. -- = Not applicable.

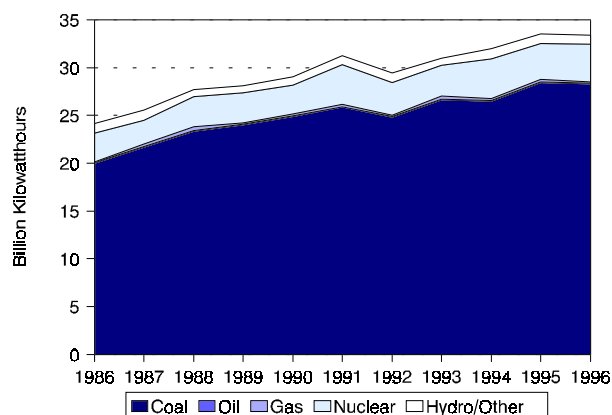
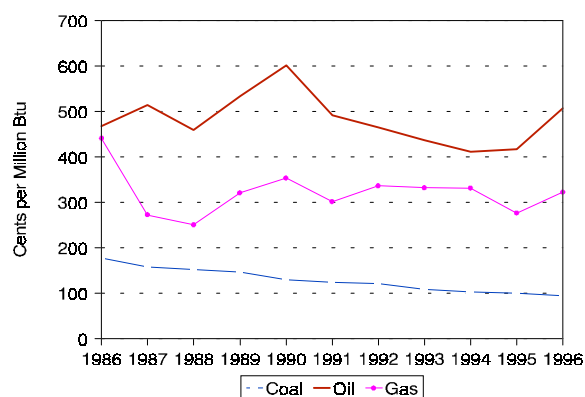
Figure 4. Utility Generation of Electricity by Primary Energy Source, 1986-1996**Figure 5. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986-1996**
(1996 Dollars)

Table 7. Utility Delivered Fuel Prices for Coal, Oil, and Gas, 1986, 1991, and 1996
(Cents per Million Btu, 1996 Dollars)

Fuel	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)
Coal	177.1	124.1	94.1	-6.1
Oil	468.0	492.0	507.5	0.8
Gas	441.3	301.8	322.4	-3.1

Table 8. Electric Power Industry Emissions Estimates, 1986, 1991, and 1996
(Thousand Short Tons)

Emission Type	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)
Sulfur Dioxide	187	202	165	-1.2
Nitrogen Oxides ^d . .	114	153	151	2.8
Carbon Dioxide ^d . .	23,265	32,000	35,938	4.4

Figure 6. Estimated Sulfur Dioxide Emissions, 1986-1996

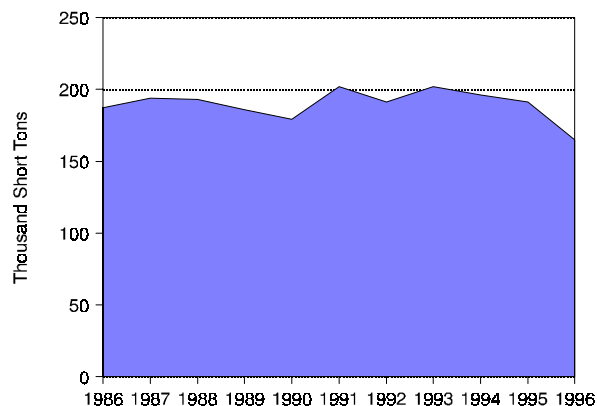


Figure 7. Estimated Nitrogen Oxide Emissions, 1986-1996

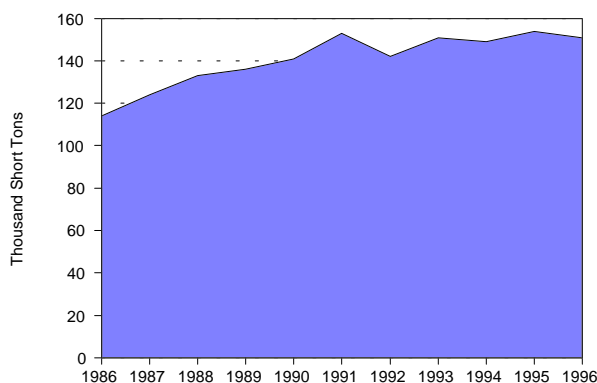


Figure 8. Estimated Carbon Dioxide Emissions, 1986-1996

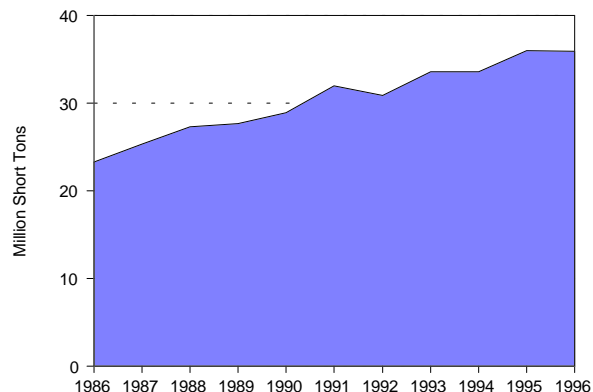
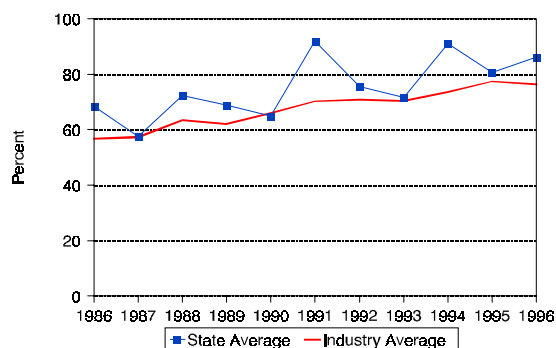


Table 9. Utility Retail Sales by Sector, 1986, 1991, and 1996
(Megawatthours)

Sector	1986	1991	1996	Annual Growth Rate 1986-1996 (Percent)	Percentage Share 1986	Percentage Share 1991	Percentage Share 1996
Residential . .	10,008,096	11,159,190	11,537,222	1.4	38.0	36.3	33.0
Commercial .	5,790,760	7,123,125	7,338,062	2.4	22.0	23.1	21.0
Industrial . . .	9,796,836	11,684,144	14,788,783	4.2	37.2	38.0	42.3
Other	759,872	815,003	1,335,349	5.8	2.9	2.6	3.8
Total	26,355,574	30,781,462	34,999,416	2.9	100.0	100.0	100.0

Figure 9. Nuclear Power Capacity Factor Comparison, 1986-1996**Table 10. Utility Retail Sales Statistics, 1986, 1991, and 1996**

Item	Investor-Owned Utility	Public	Federal	Cooperative	Total
	1986				
Number of Utilities	9	139	--	52	200
Number of Retail Customers	929,939	179,675	--	172,919	1,282,533
Retail Sales (MWh)	20,112,062	3,354,442	--	2,889,070	26,355,574
Percentage of Retail Sales	76.3	12.7	--	11.0	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	1,642,707	235,884	--	270,022	2,148,613
Percentage of Revenue	76.5	11.0	--	12.6	100.0
1991					
Number of Utilities	8	138	--	52	198
Number of Retail Customers	955,245	182,748	--	180,492	1,318,485
Retail Sales (MWh)	23,760,615	3,937,944	--	3,082,903	30,781,462
Percentage of Retail Sales	77.2	12.8	--	10.0	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	1,549,487	239,267	--	267,028	2,055,781
Percentage of Revenue	75.4	11.6	--	13.0	100.0
1996					
Number of Utilities	4	138	--	48	190
Number of Retail Customers	1,000,740	190,489	--	184,117	1,375,346
Retail Sales (MWh)	27,151,481	4,388,143	--	3,459,792	34,999,416
Percentage of Retail Sales	77.6	12.5	--	9.9	100.0
Revenue from Retail Sales (thousand 1996 \$) ^e	1,572,129	239,214	--	267,156	2,078,499
Percentage of Revenue	75.6	11.5	--	12.9	100.0

-- = Not applicable.